

Two-coloured laser light to control the Einstein Telescope

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The proposed Einstein Telescope (ET) will employ laser light to meticulously monitor the distance between two freely hanging mirrors suspended kilometres apart, enabling the precise detection of subtle distortions in spacetime known as gravitational waves.

For ET to achieve sensitivities greater than $10^{-24}/\sqrt{\text{Hz}}$, various new technologies need to be developed and tested. One of these new advancements will be the switch to silicon based mirrors. Because of silicon's high absorption at lower wavelengths, new laser wavelengths are required. Two proposed solutions are the wavelengths of **1550nm** and **2090nm**, but these still need considerable development before implementation.

The Two-Colour Project aims to combine these two wavelengths to create a controlling system, based on principles used in the **ALS** (Arm Length Stabilisation) [4] system from current detectors. Additionally this concept could provide a solution for the poor photodetector characteristics at $> 2 \mu\text{m}$.

Primary authors: STEINLECHNER, Sebastian; SCHOON, Tobias (Maastricht University & Nikhef); GUO, Yuefan (Nikhef)

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